Name: Date:

Polynomial Factoring solution (version 616)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 4x + 15 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(15)}}{2(1)}$$

$$x = \frac{-(-4) \pm \sqrt{16 - 60}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{-44}}{2}$$

$$x = \frac{4 \pm \sqrt{-4 \cdot 11}}{2}$$

$$x = \frac{4 \pm 2\sqrt{11}\, i}{2}$$

$$x = 2 \pm \sqrt{11}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $3 + 5i$ and $9 + 6i$ in standard form ($a + bi$).**

Solution

$$(3 + 5i) \cdot (9 + 6i)$$

$$27 + 18i + 45i + 30i^2$$

$$27 + 18i + 45i - 30$$

$$27 - 30 + 18i + 45i$$

$$-3 + 63i$$

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3. **Write function $f(x) = x^3 + 2x^2 - 23x - 60$ in factored form. I'll give you a hint: one factor is $(x + 4)$.**

Solution

	1	2	-23	-60
-4		-4	8	60
	1	-2	-15	0

$$f(x) = (x + 4)(x^2 - 2x - 15)$$

$$f(x) = (x + 4)(x - 5)(x + 3)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = (x + 8) \cdot (x + 3)^2 \cdot (x - 1)^2 \cdot (x - 5)^2$$

Sketch a graph of polynomial $y = p(x)$.